

MONITORING CRYOSPHERIC PROCESSES IN CANADA WITH SPACEBORNE SCATTEROMETER AND PASSIVE MICROWAVE DATA

Frédérique C. Pivot¹, Kyle C. McDonald², Claude R. Duguay^{1,3}, and Anne E. Walker⁴

ABSTRACT

Recent investigations have demonstrated the potential of scatterometer data acquired at Ku-band (25-km resolution) and C-band (50-km resolution) for monitoring the freeze/thaw status forest and tundra surfaces in Alaska and Siberia. Although the scatterometer data were originally intended for determining wind speed over the oceans, these data offer a great potential for monitoring cryospheric processes from regional to hemispheric scales. Scatterometers, which have a much wider field of view than SAR sensors, can provide a global picture of the land surface every few days with ERS-1 and -2, and on a daily basis with seawinds on Quikscat. These data can therefore provide a week-to-week, month-to-month and year-to-year perspective of how land surfaces are changing. The coarser spatial resolution data are also of particular interest for climate modelling and for understanding the fluxes between the land surface and the atmosphere.

The primary objective of this study is to investigate the potential of scatterometer data from the SeaWinds scatterometer onboard Quikscat for monitoring the Canadian cryosphere, especially in the Canadian Prairies area. In this poster, we present how we employ Quikscat data to monitor cryospheric processes over various regions of Canada (i.e. frozen/thawed state of various surface types, snow accumulation/melt and episodic thaw/refreezing events). Backscatter measurements are systematically compared with the available meteorological and cryospheric data for several sampling sites well-characterising the variety of landscapes, in order to accurately assess the way the different cryospheric components and processes are involved in the backscatter response. Furthermore, we precisely evaluate the synergistic use of Ku-band backscatter and passive microwave sensors for monitoring cryosphere by comparing Quikscat backscatter with the SSM/I brightness temperature (daily, seasonal, annual, and interannual variability).

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¹ Laboratoire de Télédétection et de Modélisation des Environnements Froids (LTMEF), Département de Géographie et Centre d'Études Nordiques, Université Laval, Québec, G1K 7P4, Canada.

² Terrestrial Science Research Element, Jet Propulsion Laboratory, Mail Stop 300-233, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, California, 91109-8099, U.S.A

³ Geophysical Institute, Department of Geology and Geophysics, Natural Science Facility, University of Alaska Fairbanks, 900 Yukon Drive, P.O. Box 755780, Fairbanks, AK 99775-5780, U.S.A.

⁴ Meteorological Service of Canada, Climate Research Branch, Downsview, Ontario, M3H 5T4, Canada.